WHAT IS CLAIMED IS:

1. A polarisation rotator for rotating a polarisation direction of linearly polarised input light by an angle γ different from 90°, comprising a first input alignment surface, a second output alignment surface, and a layer of liquid crystal material having a liquid crystal director and being disposed between said first alignment surface and said second alignment surface, said rotator having a mode in which a 90° twist of said liquid crystal director is induced across said layer, the layer having a retardation substantially given by:

$$\tan\left[\pm\frac{\pi}{2}-\gamma\right]=\frac{\tan\left[\pm\frac{\pi}{2}\cdot\sqrt{1+\alpha^2}\right]}{\sqrt{1+\alpha^2}}$$

$$\alpha=\pm\frac{2\cdot\Delta n\cdot d}{\lambda}$$

$$2\theta=\gamma\mp\frac{\pi}{2}$$

where λ is a wavelength of light, Δn is a birefringence of said liquid crystal material, d is a thickness of said layer, and θ is an angle between said polarisation direction of said input light and an alignment direction of said first alignment surface.

2. A rotator as claimed in claim 1, in which λ is a

wavelength of visible light.

3. A rotator as claimed in claim 1, having a further mode in which there is substantially no twist of said liquid crystal director across said layer.

4. A rotator as claimed in claim 1, in which said first and second alignment surfaces induce said 90° twist of said director across said layer.

5. A rotator as claimed in claim 1, in which said liquid crystal material contains a chiral dopant.

6. A rotator as claimed in claim 5, in which said chiral dopant induces said 90° twist of said director across said layer.

7. A rotator as claimed in claim 1, in which said liquid crystal material is a nematic liquid crystal material of positive dielectric anisotropy.

8. A rotator as claimed in claim 1, in which said liquid crystal material is a smectic liquid crystal material.

9. A rotator as claimed in claim 1, in which said liquid crystal material is a nematic liquid crystal material of negative dielectric anisotropy.

10. A rotator as claimed in claim 1, in which said first and second alignment surfaces induce first and second pretilts which are substantially equal to each other.

11. A rotator as claimed in claim 1, comprising an electrode arrangement for selectively applying a field across at least one region of said layer.

12. A rotator as claimed in claim 11, in which said electrode arrangement comprises one of an active matrix and a passive matrix.

13. A rotator as claimed in claim 1, comprising an input polariser having a transmission axis oriented at $-\theta$ to said alignment direction of said first alignment surface.

14. A rotator as claimed in claim 1, comprising an output polariser having a transmission axis substantially perpendicular to said polarisation direction of said input light.

15. A rotator as claimed in claim 1, comprising an output polariser having a transmission axis oriented at substantially $(\gamma + n.90)°$ to said polarisation direction of said input light, where n is an integer.

16. A rotator as claimed in claim 1, in which $40° \leq |\gamma| \leq 70°$.

17. A rotator as claimed in claim 16, in which $\gamma = \pm 45°$ and $\Delta n.d/\lambda = 0.487$.

18. A rotator as claimed in claim 17, in which $\theta = \mp 22.5°$.

19. A rotator as claimed in claim 17, in which $\theta = \mp 12.5°$.

20. A rotator as claimed in claim 1, in which $\gamma = \pm 55°$ and $\Delta n.d/\lambda = 0.55$.

21. A rotator as claimed in claim 11, in which $\theta = \mp 17.5°$.

22. A rotator as claimed in claim 1, in which $175° \leq |\gamma| \leq 180°$.

23. A rotator as claimed in claim 22, in which $\gamma = 180°$, $\theta = \pm 45°$ and $\Delta n.d/\lambda = 1.414$.

24. A rotator as claimed in claim 22, in which $\gamma = \pm 178°$, $\theta = \pm 44°$ and $\Delta n.d/\lambda = 0.105$.

25. A parallax barrier comprising a polarisation rotator for rotating a polarisation direction of linearly polarised input light by an angle γ different from 90°, comprising a first input alignment surface, a second output alignment surface, and a layer of liquid crystal material having a liquid crystal director and being disposed between said first alignment surface and said second alignment surface, said rotator having a mode in which a 90° twist of said liquid crystal director is induced across said layer, the layer having a retardation substantially given by:

$$\tan\left[\pm\frac{\pi}{2}-\gamma\right]=\frac{\tan\left[\pm\frac{\pi}{2}\cdot\sqrt{1+\alpha^2}\right]}{\sqrt{1+\alpha^2}}$$

$$\alpha=\pm\frac{2\cdot\Delta n\cdot d}{\lambda}$$

$$2\theta=\gamma\mp\frac{\pi}{2}$$

where λ is a wavelength of light, Δn is a birefringence of said liquid crystal material, d is a thickness of said layer, and θ is an angle between said polarisation direction of said input light and an alignment direction of said first alignment surface.

26. A barrier as claimed in claim 25, comprising a patterned retarder.

27. A barrier as claimed in claim 26, in which said retarder is a halfwave retarder.

28. A barrier as claimed in claim 27, in which said retarder comprises first and second regions having slow axes and γ is equal to an included angle between said slow axes of said first and second regions.

29. A barrier as claimed in claim 28, in which said included angle is between 40° and 70°.

30. A barrier as claimed in claim 29, in which said slow axis of one of said first and second regions is one of parallel and perpendicular to said polarisation direction of said input light.

31. A barrier as claimed in claim 30, in which said slow axis of another of said first and second regions is oriented at 45° to said polarisation direction of said input light.

32. A barrier as claimed in claim 30, in which said slow axis of another of said first and second regions is oriented at 55° to said polarisation direction of said input light.

33. A display comprising a polarisation rotator for rotating a polarisation direction of linearly polarised input light by an angle γ different from 90°, comprising a first input alignment surface, a second output alignment surface, and a layer of liquid crystal material having a liquid crystal director and being disposed between said first alignment surface and said second alignment surface, said rotator having a mode in which a 90° twist of said liquid crystal director is induced across said layer, the layer having a retardation substantially given by:

$$\tan\left[\pm\frac{\pi}{2}-\gamma\right]=\frac{\tan\left[\pm\frac{\pi}{2}\cdot\sqrt{1+\alpha^2}\right]}{\sqrt{1+\alpha^2}}$$

$$\alpha=\pm\frac{2\cdot\Delta n\cdot d}{\lambda}$$

$$2\theta=\gamma\mp\frac{\pi}{2}$$

where λ is a wavelength of light, Δn is a birefringence of said liquid crystal material, d is a thickness of said layer, and θ is an angle between said polarisation direction of said input light and an alignment direction of said first alignment surface.

34. An optical modulator comprising a polarisation rotator for rotating a polarisation direction of linearly polarised

input light by an angle γ different from 90°, comprising a first input alignment surface, a second output alignment surface, and a layer of liquid crystal material having a liquid crystal director and being disposed between said first alignment surface and said second alignment surface, said rotator having a mode in which a 90° twist of said liquid crystal director is induced across said layer, the layer having a retardation substantially given by:

$$\tan\left[\pm\frac{\pi}{2}-\gamma\right]=\frac{\tan\left[\pm\frac{\pi}{2}\cdot\sqrt{1+\alpha^2}\right]}{\sqrt{1+\alpha^2}}$$

$$\alpha=\pm\frac{2\cdot\Delta n\cdot d}{\lambda}$$

$$2\theta=\gamma\mp\frac{\pi}{2}$$

where λ is a wavelength of light, Δn is a birefringence of said liquid crystal material, d is a thickness of said layer, and θ is an angle between said polarisation direction of said input light and an alignment direction of said first alignment surface.